#### WHAT IS CLAIMED IS:

1. A method for producing a catalyst composition which catalyzes the formation of bisphenols from aromatic hydroxy compounds and carbonyl containing compounds, said method comprising the step of attaching a poly-sulfur mercaptan promoter component to a solid acid support component comprising a protic acid functionality, said poly-sulfur mercaptan promoter component having the following structure (I),

$$R_{1} = \left\{ \left( -X - \right)_{a} - S - \left( -Y - \right)_{c} - S - R_{2} \right\}_{d}$$
(I)

wherein  $R_1$  is a benzothiazole functionality;

wherein a is between about 0 and about 11;

wherein b is between about 1 and about 11;

wherein c is between about 1 and about 11;

wherein d is between about 1 and about 5;

wherein X is a linking functionality which is one member selected from the group consisting of a linear aliphatic chain comprising between about 1 and about 11 carbon atoms, a cyclic aliphatic ring comprising at least 5 carbon atoms, a cyclic aromatic ring comprising at least 6 carbon atoms, a cyclic aliphatic heterocycle comprising at least 3 carbon atoms, and a cyclic aromatic heterocycle comprising at least 3 carbon atoms;

wherein Y is a linking functionality which is one member selected from the group consisting of a linear aliphatic chain comprising between about 1 and about 11 carbon atoms, a cyclic aliphatic ring comprising at least 5 carbon atoms, a cyclic aromatic ring comprising at least 6 carbon atoms, a cyclic aliphatic heterocycle

comprising at least 3 carbon atoms, and a cyclic aromatic heterocycle comprising at least 3 carbon atoms; and

wherein  $R_2$  is one member selected from the group consisting of a hydrogen, a secondary aliphatic functionality, a tertiary aliphatic functionality, an ester functionality, a carbonate functionality, and a benzyl functionality which is attached via the benzylic methylene carbon.

- 2. The method of claim 1, wherein said tertiary aliphatic functionality is one member selected from the group consisting of a branched aliphatic functionality, and a cyclic aliphatic functionality.
- 3. The method of claim 1, wherein said R<sub>2</sub> functionality is one member selected from the group consisting of an isopropyl functionality, an isobutyl functionality, a tertiary butyl functionality, a tertiary amyl functionality, a cyclopentyl functionality, a benzyl, a 4-methoxybenzyl functionality, a 1-methylcyclohexyl functionality, and a cyclohexyl functionality.
- 4. The method of claim 1, wherein said ester functionality is one member selected from the group consisting of an acetate functionality, a propionate functionality, and a benzoate functionality.
- 5. The method of claim 1, wherein said carbonate functionality is one member selected from the group consisting of an alkyl carbonate functionality, and an aromatic carbonate functionality.
- 6. The method of claim 1, wherein the bisphenol which is being formed is 4,4'-isopropylidenediphenol.
- 7. The method of claim 1, wherein the carbonyl containing compound is a ketone or an aldehyde.
- 8. The method of claim 1, wherein the aromatic hydroxy compound is phenol, and the carbonyl containing compound is acetone.
- 9. The method of claim 1, wherein the attachment step is performed in an aqueous solution comprising water.
- 10. The method of claim 1, wherein said solid acid comprises at least one member selected from the group consisting of polystyrene, a zeolite, and silica.

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11. A method for producing a catalyst composition which catalyzes the formation of bisphenols from aromatic hydroxy compounds and carbonyl containing compounds, said method comprising the step of attaching a poly-sulfur mercaptan promoter component to a polymeric resin component comprising a protic acid functionality, wherein said poly-sulfur mercaptan promoter component is a functionalized benzothiazole mercaptan.

12. The method of claim 11, wherein said a functionalized benzothiazole mercaptan has the structure (IV),

$$R_{17}$$

$$R_{18}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

wherein 1 is between about 0 and about 11;

wherein m is between about 1 and about 11;

wherein n is between about 1 and about 11;

wherein  $R_{15}$  is a hydrogen atom or a sulfur-protecting functionality which is one member selected from the group consisting of an aliphatic functionality comprising at least about 4 carbon atom, an ester functionality comprising between about 1 and about 11 carbon atoms, a carbonate functionality comprising between about 1 and about 11 carbon atoms, and a benzylic functionality comprising at least about 7 carbon atoms which is attached to the terminal sulfur atom via the benzylic methylene carbon; and

wherein each of R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, and R<sub>19</sub> are independently one member selected from the group consisting of a hydrogen, a fluoride, a bromide, a chloride, an iodide, a vinyl group, a hydroxide, an alkoxide functionality comprising between about 1 and about 11 carbon atoms, an aryloxide functionality comprising at least about 6 carbon atoms, an aliphatic functionality comprising between about 1 and about 11 carbon atoms, an aromatic functionality comprising at least about 6 carbon atoms, a cycloaliphatic ring comprising at least about 5 carbon atoms, said cycloaliphatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent, and a

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cycloaromatic ring comprising at least about 6 carbon atoms, said cycloaromatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent.

- 13. The method of claim 11, wherein the bisphenol which is being formed is 4,4'-isopropylidenediphenol.
- 14. The method of claim 11, wherein the carbonyl containing compound is a ketone or an aldehyde.
- 15. The method of claim 11, wherein the aromatic hydroxy compound is phenol, and the carbonyl containing compound is acetone.
- 16. The method of claim 11, wherein the attachment step is performed in an aqueous solution comprising water.
- 17. The method of claim 11, wherein said polymeric resin comprises at least one member selected from the group consisting of polystyrene, a zeolite, and silica.
- 18. The method of claim 17, wherein said polymeric resin further comprises divinylbenzene.
- 19. The method of claim 18, wherein the amount of divinylbenzene is up to about 12 percent of the total weight of the polymeric resin.
- 20. The method of claim 11, wherein said protic acid functionality comprises at least one member selected from the group consisting of a sulfonic acid functionality, a phosphonic acid functionality, and a carboxylic acid functionality.
- 21. The method of claim 12, wherein the linking functionality X, is the same as the linking functionality Y.

22. The method of claim 12, wherein the bisphenol is 4,4'-isopropylidenediphenol, the aromatic hydroxy compound is phenol, the carbonyl containing compound is acetone, and said promoter component is,

$$\begin{array}{c|c} H \\ \hline \\ H \\ \hline \\ H \\ \end{array}$$

wherein R<sub>33</sub> is a hydrogen atom or a sulfur-protecting functionality which is one member selected from the group consisting of an aliphatic functionality comprising at least about 4 carbon atom, an ester functionality comprising between about 1 and about 11 carbon atoms, a carbonate functionality comprising between about 1 and about 11 carbon atoms, and a benzylic functionality comprising at least about 7 carbon atoms which is attached via the benzylic methylene carbon; and

wherein y is 3 or 6.

23. A method for forming bisphenols, comprising the step of reacting an aromatic hydroxy compound with a carbonyl containing compound in the presence of a catalyst composition, said catalyst composition comprising a solid acid component and a poly-sulfur mercaptan promoter component having the following structure (I),

$$R_{1} = \left\{ \left( \begin{array}{c} X \\ \end{array} \right)_{a} = S = \begin{array}{c} \\ \\ \end{array} \right\}_{b} \left( \begin{array}{c} Y \\ \end{array} \right)_{c} = S = -R_{2}$$
(I)

wherein R<sub>1</sub> is a benzothiazole functionality;

wherein a is between about 0 and about 11;

wherein b is between about 1 and about 11;

wherein c is between about 1 and about 11;

wherein d is between about 1 and about 5;

wherein X is a linking functionality which is one member selected from the group consisting of a linear aliphatic chain comprising between about 1 and about 11 carbon atoms, a cyclic aliphatic ring comprising at least 5 carbon atoms, a cyclic aromatic ring comprising at least 6 carbon atoms, a cyclic aliphatic heterocycle comprising at least 3 carbon atoms, and a cyclic aromatic heterocycle comprising at least 3 carbon atoms;

wherein Y is a linking functionality which is one member selected from the group consisting of a linear aliphatic chain comprising between about 1 and about 11 carbon atoms, a cyclic aliphatic ring comprising at least 5 carbon atoms, a cyclic aromatic ring comprising at least 6 carbon atoms, a cyclic aliphatic heterocycle comprising at least 3 carbon atoms, and a cyclic aromatic heterocycle comprising at least 3 carbon atoms; and

wherein  $R_2$  is one member selected from the group consisting of a hydrogen, a secondary aliphatic functionality, a tertiary aliphatic functionality, an ester functionality, a carbonate functionality, and a benzyl functionality which is attached via the benzylic methylene carbon.

- 24. The method of claim 23, wherein said tertiary aliphatic functionality is one member selected from the group consisting of a branched aliphatic functionality, and a cyclic aliphatic functionality.
- 25. The method of claim 23, wherein said  $R_2$  is one member selected from the group consisting of a, an isopropyl functionality, an isobutyl functionality, a tertiary butyl functionality, a tertiary amyl functionality, a cyclopentyl functionality, a benzyl, a 4-methoxybenzyl, a 1-methylcyclohexyl functionality, and a cyclohexyl functionality.
- 26. The method of claim 23, wherein said ester functionality is one member selected from the group consisting of an acetate functionality, a propionate functionality, and a benzoate functionality.
- 27. The method of claim 23, wherein said carbonate functionality is one member selected from the group consisting of an alkyl carbonate functionality, and an aromatic carbonate functionality.
- 28. The method of claim 23, wherein the bisphenol which is being formed is 4,4'-isopropylidenediphenol.
- 29. The method of claim 23 wherein the aromatic hydroxy compound is phenol.
- 30. The method of claim 23, wherein the carbonyl containing compound is a ketone or an aldehyde.
  - 31. The method of claim 30 wherein the ketone is acetone.
- 32. The method of claim 23, wherein said solid acid comprises at least one member selected from the group consisting of polystyrene, a zeolite, and silica.
- 33. The method of claim 23, wherein said solid acid is a sulfonic acid functionalized polymeric resin.

- 34. The method of claim 23, wherein said solid acid is a sulfonic acid functionalized polymeric resin.
- 35. The method of claim 34, wherein said polymeric resin further comprises divinylbenzene.
- 36. The method of claim 35, wherein the amount of divinylbenzene is up to about 12 percent of the total weight of the polymeric resin.
- 37. The method of claim 23, wherein said solid acid component comprises at least one member selected from the group consisting of a sulfonic acid functionality, a phosphonic acid functionality, and a carboxylic acid functionality.
- 38. The method of claim 23, wherein the linking functionality X, is the same as the linking functionality Y.
- 39. A method for forming bisphenols, comprising the step of reacting an aromatic hydroxy compound with a carbonyl containing compound in the presence of a catalyst composition, said catalyst composition comprising a polymeric resin component comprising a protic acid functionality, and a poly-sulfur mercaptan promoter component, wherein said poly-sulfur mercaptan promoter component is a functionalized benzothiazole mercaptan.

40. The method of claim 39, wherein said functionalized benzothiazole mercaptan has the structure (IV),

$$R_{17}$$

$$R_{18}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

$$R_{19}$$

wherein 1 is between about 0 and about 11;

wherein m is between about 1 and about 11;

wherein n is between about 1 and about 11;

wherein R<sub>15</sub> is a hydrogen atom or a sulfur-protecting functionality which is one member selected from the group consisting of an aliphatic functionality comprising at least about 4 carbon atom, an ester functionality comprising between about 1 and about 11 carbon atoms, a carbonate functionality comprising between about 1 and about 11 carbon atoms, and a benzylic functionality comprising at least about 7 carbon atoms which is attached to the terminal sulfur atom via the benzylic methylene carbon; and

wherein each of R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, and R<sub>19</sub> are independently one member selected from the group consisting of a hydrogen, a fluoride, a bromide, a chloride, an iodide, a vinyl group, a hydroxide, an alkoxide functionality comprising between about 1 and about 11 carbon atoms, an aryloxide functionality comprising at least about 6 carbon atoms, an aliphatic functionality comprising between about 1 and about 11 carbon atoms, an aromatic functionality comprising at least about 6 carbon atoms, a cycloaliphatic ring comprising at least about 5 carbon atoms, said cycloaliphatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent, and a

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cycloaromatic ring comprising at least about 6 carbon atoms, said cycloaromatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent.

- 41. The method of claim 40, wherein the bisphenol which is being formed is 4,4'-isopropylidenediphenol.
- 42. The method of claim 40, wherein the aromatic hydroxy compound is phenol.
- 43. The method of claim 40, wherein the carbonyl containing compound is a ketone or an aldehyde.
  - 44. The method of claim 43, wherein the ketone is acetone.
- 45. The method of claim 40, wherein said polymeric resin comprises at least one member selected from the group consisting of polystyrene, a zeolite, and silica.
- 46. The method of claim 45, wherein said polymeric resin further comprises divinylbenzene.
- 47. The method of claim 46, wherein the amount of divinylbenzene is up to about 12 percent based on the total weight of the polymeric resin.
- 48. The method of claim 40, wherein said protic acid functionality comprises at least one member selected from the group consisting of a sulfonic acid functionality, a phosphonic acid functionality, and a carboxylic acid functionality.
- 49. The method of claim 40, wherein the linking functionality X, is the same as the linking functionality Y.

50. The method of claim 39, wherein the bisphenol is 4,4'-isopropylidenediphenol, the aromatic hydroxy compound is phenol, the carbonyl containing compound is acetone, and said promoter component is,

$$\begin{array}{c} H \\ \\ H \\ \\ H \end{array}$$

wherein  $R_{33}$  is a hydrogen atom or a sulfur-protecting functionality which is one member selected from the group consisting of an aliphatic functionality comprising at least about 4 carbon atom, an ester functionality comprising between about 1 and about 11 carbon atoms, a carbonate functionality comprising between about 1 and about 11 carbon atoms, and a benzylic functionality comprising at least about 7 carbon atoms which is attached to the terminal sulfur atom via the benzylic methylene carbon; and

wherein y is 3 or 6.

### 51. A benzothiazole compound having the following structure (IV),

$$R_{17}$$

$$R_{18}$$

$$R_{19}$$

$$R_{19}$$

$$(IV)$$

wherein 1 is between about 0 and about 11;

wherein m is between about 1 and about 11;

wherein n is between about 1 and about 11;

wherein  $R_{15}$  is a hydrogen atom or a sulfur-protecting functionality which is one member selected from the group consisting of an aliphatic functionality comprising at least about 4 carbon atom, an ester functionality comprising between about 1 and about 11 carbon atoms, a carbonate functionality comprising between about 1 and about 11 carbon atoms, and a benzylic functionality comprising at least about 7 carbon atoms which is attached to the terminal sulfur atom via the benzylic methylene carbon; and

wherein each of R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, and R<sub>19</sub> are independently one member selected from the group consisting of a hydrogen, a fluoride, a bromide, a chloride, an iodide, a vinyl group, a hydroxide, an alkoxide functionality comprising between about 1 and about 11 carbon atoms, an aryloxide functionality comprising at least about 6 carbon atoms, an aliphatic functionality comprising between about 1 and about 11 carbon atoms, an aromatic functionality comprising at least about 6 carbon atoms, a cycloaliphatic ring comprising at least about 5 carbon atoms, said cycloaliphatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent, and a

cycloaromatic ring comprising at least about 6 carbon atoms, said cycloaromatic ring being fused to the benzothiazole arene ring through an adjacent ring substituent.